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Academy in its brilliant days under the first empire.

Nature is so varied in her manifestations and phenomena, and the difficulty of elucidating their causes is so great, that many must unite their knowledge and efforts in order to comprehend her and force her to reveal her laws. This union becomes indispensable when the progress of the sciences, multiplying their points of contact, and no longer permitting a single individual to understand them all, throws upon a group of investigators the task of furnishing the mutual aid which they demand. Thus the physicist appeals to the mathematician in his efforts to arrive at the general causes of observed phenomena, and the mathematician in his turn consults the physicist, in order to render his investigations useful by practical applications, and in the hope of opening up new possibilities in mathematics. But the chief advantage of academies is the philosophic spirit which must develop within them, thence diffusing itself throughout the nation and permeating every interest. The isolated scholar may yield with impunity to the tendencies of the systematist, since he hears only from afar the criticism that he arouses. But in an academy the impact of such tendencies ends in their destruction, and the desire for mutual conviction necessarily establishes the rule of admitting only the results of observation and calculation. Furthermore, experience has shown that since the origin of academies the true spirit of philosophy has prevailed. By setting the example of submitting everything to the test of severe logic, they have overthrown the preconceived notions which too long dominated science, and were shared by the ablest minds of previous centuries. Their useful influence on public opinion has dissipated errors greeted in our own time with an enthusiasm which would have perpetuated them in earlier days. Equally removed from the credulity which denies nothing and the conservatism which would reject everything that departs from accepted ideas, they have at all times wisely awaited the result of observation and experiment on difficult questions and unusual phenomena, promoting them by prizes and by their own researches. Measuring their approval no less by the greatness and difficulty of a discovery than by its immediate utility, and convinced, by many examples, that what appears to be least fruitful may ultimately yield important consequences, they have encouraged the pursuit of truth in all fields, excluding

only those which the limitations of the human understanding render forever inaccessible. Finally, we owe to them those great theories, elevated by their generality above the comprehension of the layman, which through numerous applications to natural phenomena and the arts, have become inexhaustible sources of happiness and enlightenment. Wise governments, convinced of the usefulness of scientific societies, and regarding them as one of the principal causes of the glory and prosperity of empires, have established such bodies in their very midst, in order to profit by their counsel, which has often brought lasting benefits.<sup>42</sup>

GEORGE ELLERY HALE

#### THE BALTIMORE MEETING OF THE NATIONAL ACADEMY OF SCIENCES

THE National Academy of Sciences will meet November 18 and 19 at the Johns Hopkins University, Baltimore. The council will meet the evening before; and on these two dates there will be public sessions with papers by members of the academy and others.

A preliminary program of these papers is as follows:

HENRY FAIRFIELD OSBORN: *Final Results on the Phylogeny or Lines of Descent in the Titanotheres.*

THOMAS H. MORGAN: *The Constitution of the Chromosomes as Indicated by the Heredity of Linked Characters.*

The paper is a discussion of recent discoveries in sex-linked inheritance and their bearing on the mechanism of heredity and the constitution of the chromosomes. Starting with the assumption that Mendel's law of segregation finds a plausible explanation in the processes known to occur in the ripening of the egg and sperm, an attempt is made to analyze the ratios that appear in sex-linked inheritance—ratios that depart from those that rest on the assumption of independent assortment of pairs of characters. It is shown how these departures find a reasonable explanation on the assumption that interchange takes place between members of the same pair of chromosomes. The Mendelian ratios, on the

<sup>42</sup> "Exposition du Système du Monde," *Oeuvres*, Vol. VI., p. 418.

other hand, occur when the pairs of factors involved lie in different chromosomes. The method by which the location of loci (factors) in the chromosomes is calculated will be explained.

H. McL. EVANS: *The Action of Vital Stains Belonging to the Benzidine Group.*

S. O. MAST: *Changes in Pattern and Color in Fishes, with Special Reference to Flounders.*

The flounders ordinarily lie on the bottom and the skin assumes a color and pattern so nearly like that of their environment that it is frequently difficult to see them. On a black bottom they become black, on a white bottom white, on a yellow bottom yellow, on a blue bottom bluish, on a red bottom reddish, etc. All of these changes in the skin are regulated through the eyes. This indicates color vision. If the bottom is finely mottled the pattern in the skin assumes a fine grain; if coarsely mottled, it assumes a coarse grain. But there is no evidence indicating an actual reproduction of the configuration of the background. If, after the skin has become adapted to a given bottom, the fish are moved to a different bottom they tend to return to the original. That is, they tend to select a bottom which harmonizes with their skin.

D. S. JOHNSON: *The Perennating Fruits of the Prickly Pears.*

The fleshy fruits of certain prickly pears are not shed, as most fruits are, but remain attached for ten years or more. These fruits continue to grow by a cambium and, while they remain attached, their axillary buds give rise to flowers only. If, however, the chains of fruits thus formed are separated from the plant their buds give rise only to roots and vegetative joints. The plants are propagated in this way. Seeds, though sometimes formed, have never been seen to germinate.

B. F. LOVELACE: *A Static Method for the Measurement of Vapor-pressures of Solutions.*

The method is based upon the principle of the Rayleigh manometer. Vapor from solvent, carefully freed from air, is admitted to one limb of the manometer and vapor from solution to the other limb. The manometer is constructed to give a sensibility of 0.0005 milli-

meter and readings are made in the usual way by means of a telescope and scale. Provision is made for stirring the solution, also for removing air to less than 0.0004 millimeter pressure, the pressure in system due to air being measurable at any time during the progress of an experiment.

H. C. JONES: *The Absorption of Light by Water Containing Strongly Hydrated Salts.*

Salts, such as magnesium and calcium chlorides, which, in aqueous solution combine with a large amount of the solvent, diminish the power of water to absorb light. Unhydrated salts, such as potassium and ammonium chlorides, produce no such effect. This would indicate that water combined with a dissolved substance has less power to absorb light than free water. This fact is in keeping with a number of others which have recently been brought to light; and they all seem to point to the general correctness of the solvate theory of solution.

SIMON FLEXNER: *Some Factors in the Epidemiology of Infection.*

KNIGHT DUNLAP: *The Fusion of Successive Flashes of Light.*

The least perceptible interval between two light stimuli is dependent on several factors, among which is the relative duration of the stimuli and the dark interval. As determined in extensive preliminary experiments with a beam of light interrupted at its focus by a properly sectored rotating disc, the least perceptible interval ranges from approximately  $20\sigma$  when the two stimuli are equal in length to the dark interval, down to  $4\sigma$  when the stimuli are 18 times the length of the intervening interval. This variation is principally a function of the length of the first stimulus, the length of the second stimulus having a slight effect of different character. Corresponding measurements for flicker give somewhat lower results, namely, from approximately  $11\sigma$  to  $2\sigma$ . The difference in these measurements is readily explained.

J. J. ABEL: *Demonstration of an Artificial Kidney.*

HOWARD A. KELLY: *Radio-therapeutics in Surgical Affections.*

A. H. PFUND: *Measurement of Stellar Radiation.*

Using a compensating vacuum-thermocouple with evacuator—both of new design—in conjunction with the 30-inch Keeler Memorial Reflector at the Allegheny Observatory, the radiation from Vega, Jupiter and Altair was observed. The sensibility of the apparatus corresponded to a deflection of 2,400 mm. for a meter—Hefner. The results for the evening of September 22, 1913, were:

Source	Deflection, Mm.	Magnitude	Remarks
Vega .....	7.5	0.19	Sky clear; no wind
Jupiter .....	3.0	—2.0	Sky clear; no wind
Altair .....	2.0	0.96	Sky hazy; no wind

(The smallness of the deflection occasioned by Jupiter is due to the circumstance that the image had more than seven times the area of the blackened disc of the thermo-junction.)

J. A. ANDERSON: *A Method for Testing Screws.*

The instrument used is the Fabry and Perot interferometer, and the method is applicable to any screw which has been ground. Periodic errors, errors of run, straightness of the axis, and coincidence of the axis of the screw with that of its pivots can all be determined with a high degree of accuracy. The method has been used in testing the screws for Rowland's ruling machines with success.

J. B. WATSON: *An Experimental Study of Homing.*

This report will discuss briefly four of the more important theories of homing, viz., the "law of counter return"; the theory of return by the aid of "visual land-marks"; the theory of "direct perception of goal" (by the aid of infra-red rays); and the "Spürsinn" of Cyon. The result of three years of experimental work in the Dry Tortugas on homing in the noddy and sooty terns will be given; special emphasis was placed upon the results obtained during the past spring. In brief, the experimenters were able to obtain thirteen returns over open water from distances ranging from five hundred to approximately one thousand miles.

On the afternoons of both the days of the

meeting opportunity will be given for visits to several of the laboratories of the Johns Hopkins University, besides the Physical Laboratory in which the meetings will be held.

In the laboratories of anatomy, plant physiology, zoology and chemistry special demonstrations will be given of the researches in progress.

There will be the usual social functions, including a reception by Dr. and Mrs. Remsen and a dinner at the Maryland Club to which the Academy is invited by the members resident in Baltimore.

### SCIENTIFIC NOTES AND NEWS

ALFRED RUSSEL WALLACE, the great English man of science, author of works on natural selection, geographical distribution and a wide range of biological and social subjects, died on November 7, in his ninety-first year.

SIR WILLIAM PREECE, the distinguished British electrical engineer, died on November 6, at the age of seventy-nine years.

DR. CHARLES MCBURNEY, formerly demonstrator of anatomy and professor of surgery in the College of Physicians of Columbia University, died on November 6, aged sixty-eight years.

A MARBLE bust of Lord Kelvin by Mr. Shannon, A.R.S.A., the gift of Lady Kelvin, was presented to the Royal Society of Edinburgh on October 28, by Professor Crum Brown, on her behalf. Principal Sir William Turner, who presided over a large gathering, said Lord Kelvin had been sixty years a fellow of the society, and was occupying the post of president for a third term of five years when he died in 1907.

AT the annual meeting of the American Mathematical Society, to be held at Columbia University on December 30-31, Dean H. B. Fine, of Princeton University, will deliver his presidential address on "An Unpublished Theorem of Kronecker Respecting Numerical Equations."

AT the dedicatory exercises of the new \$100,000 laboratory building of the college of medicine of the University of Nebraska, held in